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ONE NEW, AND OTHER LABROID FISHES FROM BALI¹

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Reef fishes are probably more abundant in species in the East Indies than anywhere else. The Michael Lerner Australia-New Zealand Expedition of 1939 obtained a considerable collection of such fishes from the island of Bali for the American Museum, which previously have been sorted and tentatively identified by Mr. John Robas and the writer, but none critically studied until now.

The Labroid fishes, wrasses and parrots, are particularly numerous in this collection and presumably make up a considerable part of the reef fauna in the region. East Indian members of this group have recently been reviewed by de Beaufort (1940, Fishes of the Indo-Australian Archipelago, VIII). We follow his nomenclature, and have compared the number of species in our collection from Bali with those listed by him for the entire region.

We also include figures of a number of our species, of which good illustrations are not readily available. These have been kindly drawn for us by Katherine G. Van Cortlandt.

Thirty-four genera of wrasses and parrotfishes are recognized by de Beaufort from the Indo-Australian Archipelago—of which our Bali collection comprises 17 as follows.

CHOERODON BLEEKER

Figure 1

We have from Bali 1 of the 7 species listed by de Beaufort, *Choerodon anchorago* (Bloch).

BODIANUS BLOCH

Figure 2

We have 1 of the 5 species listed, *Bodianus bilunulatus* (Lacépède).

NOVACULICHTHYS BLEEKER

Figure 3

We have 2 of the 3 species listed, *Novaculichthys macrolepidotus* (Bloch) and *N. taeniurus* (Lacépède).

CHEILINUS LACÉPÈDE

Figures 4, 5

We have 4 of the 12 species listed, *Cheilinus bimaculatus* Cuvier and Valenciennes, *C. chlorurus* (Bloch), *C. diagramma* (Lacépède) and *C. trilobatus* Lacépède.

C. chlorurus is differentiated from other members of the genus listed, by having 10 versus 9 dorsal spines. But one of our 2 *C. bimaculatus* has 10 spines also, the other 9.

ANAMPSES QUOY AND GAIMARD

We have one of the 9 species listed, *Anampses caeruleopunctatus* Rüppell.

CHEILIO LACÉPÈDE

We have the one species listed, *Cheilio inermis* (Forsk.).

THALASSOMA SWAINSON

Figures 6, 7, 8

We have 7 of the 11 species listed, *Thalassoma fuscum* (Lacépède), *T. Güntheri* (Bleeker), *T. hardwicki* (Bennett), *T. janseni* (Bleeker), *T. lunare* (Linnaeus), *T. melanocheir* (Bleeker), and *T. umbrostigma* (Rüppell); also an 8th species described here as new.

Thalassoma albolineum, new species

Figure 6

A *Thalassoma* with a patch of 5 or 6 scales at the top of the gill-cover; without transverse markings; in preserved material with a narrow white mesial lengthwise stripe from over the pectoral to the base of the caudal, bordered above and below by less well-defined blackish stripes; caudal margin concave, its corners exerted.

¹ Results of the Michael Lerner Ichthyological Expeditions, No. 29.

DESCRIPTION OF TYPE.—No. 14999 American Museum of Natural History, from Bali, collected by the Michael Lerner Expedition of 1939.

Length to base of caudal, 115 mm. Depth in this length, 3.4; head, 3.2; eye in head, 5; snout, 2.6; interorbital, 3.7; width of body, 2.1; depth of peduncle, 2.4; pectoral, 1.3; ventral, 2.4; last dorsal spine, 4.1; longest dorsal ray, 3.5; anal ray, 3.6; caudal, 1.7.

Dorsal rays, VIII, 13; anal, II, 12. Scales, 27.

Well compressed, deepest over pectoral, gradually tapering backward; profile gently convex, snout pointed; a pair of curved projecting canines in the middle of the upper and of the lower jaw, those of the upper jaw considerably the larger; maxillary reaching about halfway to vertical from front of eye; eye placed high, interorbital gently convex. Pectoral large, pointed; caudal small, concave behind with exerted corners. Scales on breast a little smaller than those on sides, lateral line slanting downward on the 20th to 22nd scales.

Color in preservative: head and fore part of body back to base of pectorals, blackish, the lips and chin contrastingly paler—a narrow whitish mesial stripe from over the pectorals to the base of caudal, bordered above and below by broader, more obscure blackish stripes, which join a narrow black crescent, concave behind, across the base of the caudal, which is pale behind this. The points of the crescent are drawn out to make a very narrow dusky inner edge of the caudal margins. A faint pale shade runs backward on the upper side from about the middle of the body into the upper margin of the caudal, and similarly from the lower sides, which are pale behind the pectoral, into its lower margin, the margins being pale, very narrowly edged with dusky.

Pectorals and ventrals pale, the former slightly dusky toward the tip, dorsal more or less blackish between the first and third spines, otherwise pale, with a dusky margin; anal pale.

A paratype, 95 mm. long, is similarly colored; both show evidence of other intangible markings on their dark heads.

DUYMAERIA BLEEKER

We have the one species listed, *Duymaeria flagellifera* (Cuvier and Valenciennes).

LABROIDES BLEEKER

We have 1 of the 2 species listed, *Labroides dimidiatus* (Cuvier and Valenciennes).

STETHOJULIS GÜNTHER

Figure 9

We have 6 of the 8 species listed, *Stethojulis alborivittata* (Bonnaterre), *S. axillaris*

(Quoy and Gaimard), *S. kalosoma* (Bleeker), *S. phekadopleura* (Bleeker), *S. strigiventer* (Bennett) and *S. trilineata* (Bloch and Schneider).

XENOJULIS DE BEAUFORT

We have the one species listed, *Xenojulis margaritaceus* (Macleay).

HALICHOERES RÜPPELL

Figures 10, 11 and 12

We have 12 of the 37 species listed, *Halichoeres argus* (Bloch and Schneider), *H. binotopsis* (Bleeker), *H. centiquadrus* (Lacépède), *H. kawarin* (Bleeker), *H. leparensis* (Bleeker), *H. marginatus* Rüppell, *H. nebulosus* (Cuvier and Valenciennes), *H. notopsis* (Cuvier and Valenciennes), *H. papilionaceus* (Cuvier and Valenciennes), *H. podostigma* (Bleeker), *H. scapularis* (Bennett) and *H. trimaculatus* (Quoy and Gaimard).

The striking pattern of scale marking figured for *Halichoeres argus* and *H. leparensis* (de Beaufort, 1940, p. 231) is also strongly suggested in *H. papilionaceus*, which furthermore has vertical fins marked little differently from *argus*. The three are probably closely related.

We have 9 specimens of *H. papilionaceus* from 70 to 90 mm. standard length, only 2 of *H. argus*, somewhat less well preserved, of 52 and 75 mm. Both have a differently colored caudal from what I find figured and described for *H. argus*, white with a black blotch terminally in the middle, sharply defined as in *H. papilionaceus* though of rather less extent. Their color is thus very like that of *H. papilionaceus*, except that the head markings are quite as figured for *H. argus*, well outside the considerable range of variation in *H. papilionaceus*, and the larger at least, in which that fin is perfect, has no black on the spinous dorsal, which definitely is not elevated in front as in *papilionaceus*. Of *H. argus* de Beaufort says: "Caudal yellowish, sometimes dusky or blackish towards its tip, covered by faint, dark edged, light ocelli," and Bleeker (1862, Atl. Ichth., I, Pl. xxxv, fig. 1) figures *H. guttatus* (equals *argus*) with a caudal with numerous ocelli, gradually

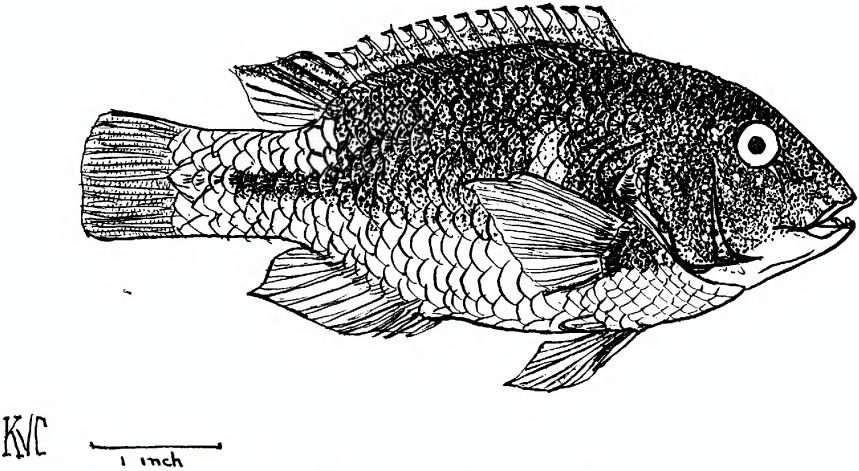


Fig. 1. *Choerodon anchorago* (Bloch).

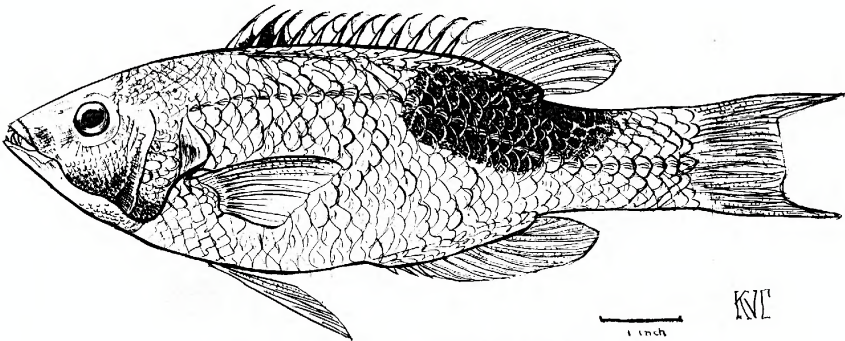


Fig. 2. *Bodianus bilunulatus* (Lacépède).

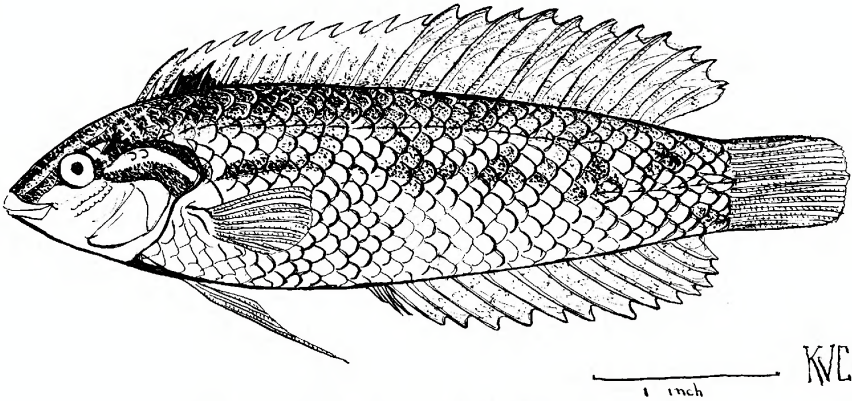


Fig. 3. *Novaculichthys macrolepidotus* (Bloch).

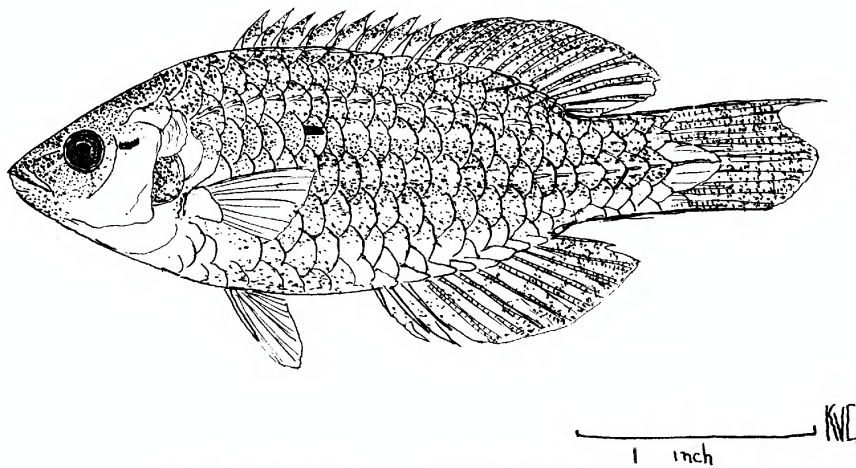


Fig. 4. *Cheilinus bimaculatus* Cuvier and Valenciennes.

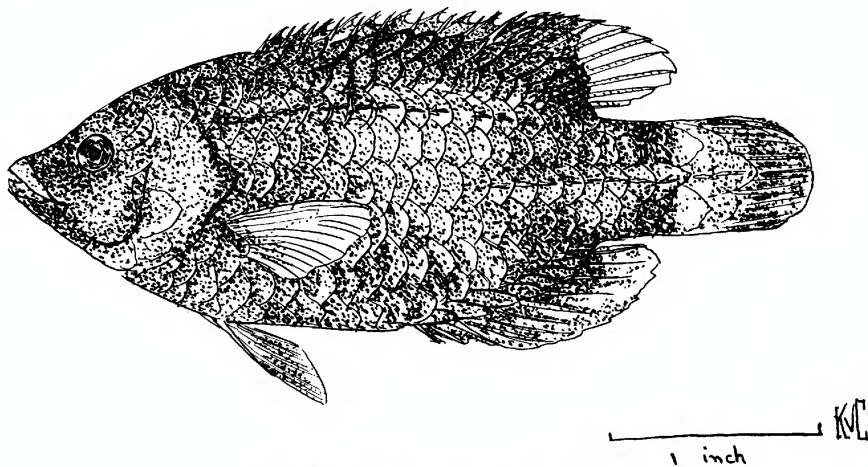


Fig. 5. *Cheilinus chlorurus* (Bloch).

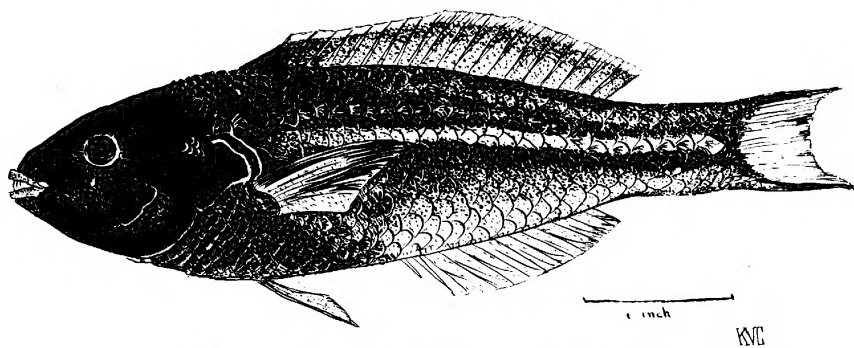


Fig. 6. *Thalassoma albolineum* Nichols, type.

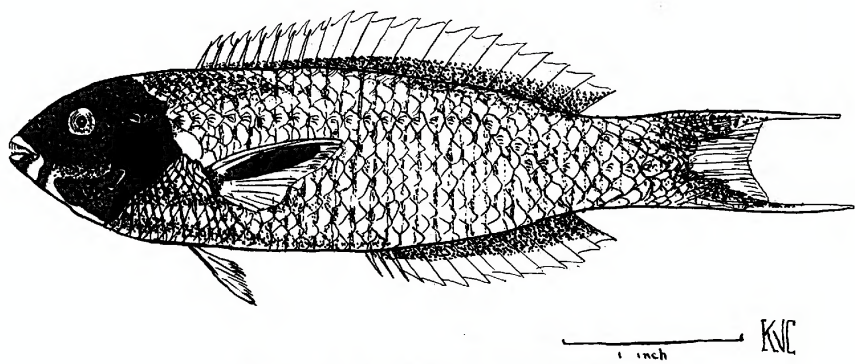


Fig. 7. *Thalassoma lunare* (Linnaeus).

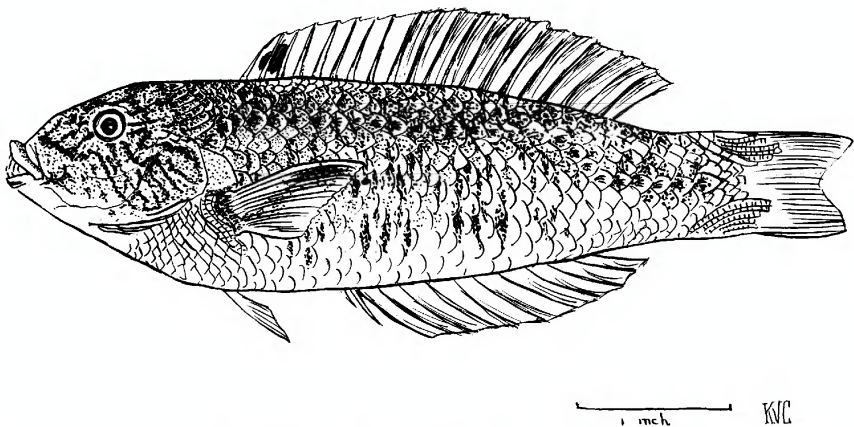


Fig. 8. *Thalassoma umbrostigma* (Rüppell).

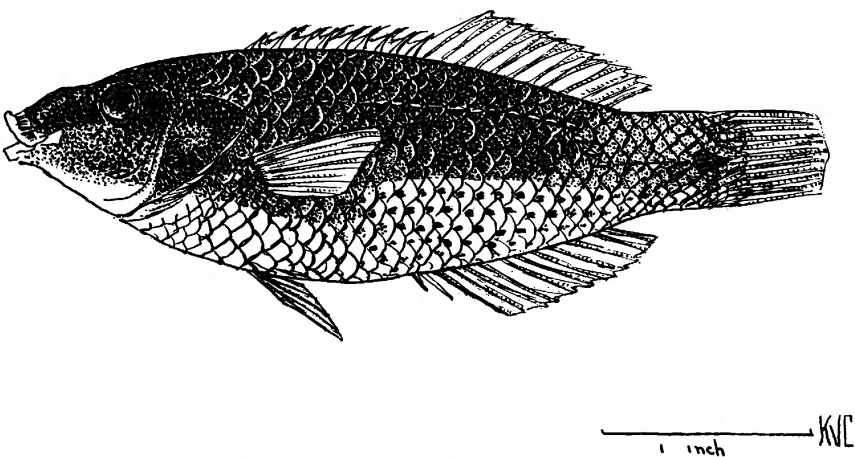


Fig. 9. *Stethojulis phkadopleura* (Bleeker).

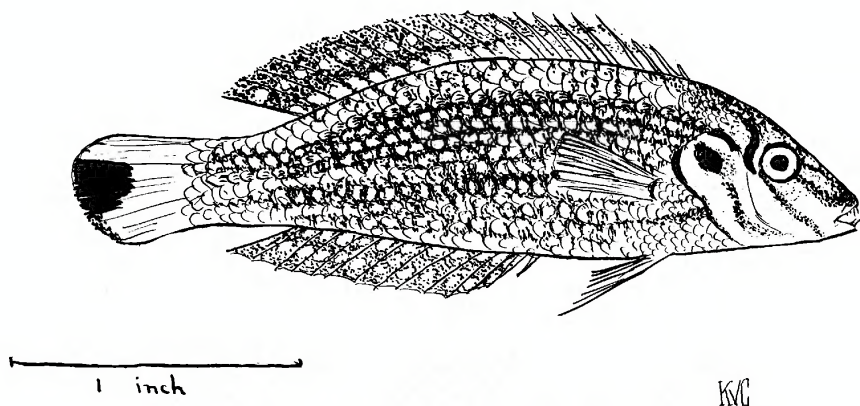


Fig. 10. *Halichoeres argus* (Bloch and Schneider), variety.

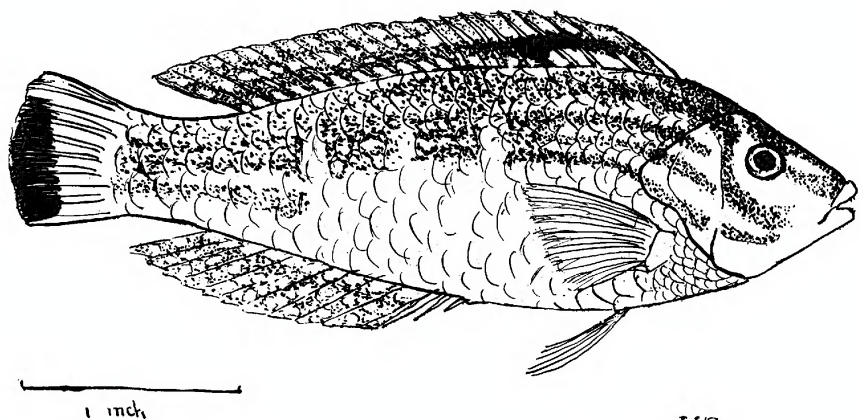


Fig. 11. *Halichoeres papilionaceus* (Cuvier and Valenciennes).

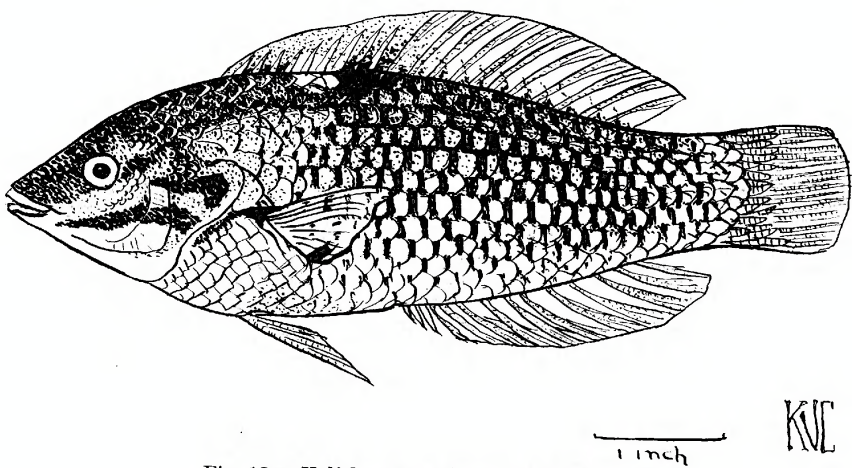


Fig. 12. *Halichoeres centiquadrus* (Lacépède).

darkening toward the tip, and with pale corners.

Halichoeres fijiensis Herre, also with the head markings of *H. argus* but the 3 black spots on dorsals and caudal base characteristic of *H. leparensis* (de Beaufort, 1940, p. 231, Fig.), de Beaufort synonymizes with *argus* and considers a hybrid with *leparensis*. Prior to examining the larger of our two specimens and studying the literature more carefully, I had thought the one of 52 mm. an undescribed form. Whereas I have now no hesitation in identifying it with *H. argus*, possibly a hybrid with *H. papilionaceus*, it is an interesting black-tailed variety of *argus* to be considered in further study of the intricate interrelationship which seems to pertain among several of these wrasses.

Both specimens have the black terminal patch in the center of the caudal. The smaller has head markings (Fig. 10) as figured for *H. argus*, in the larger the characteristic opercular blotch is present, the stripe slanting forward and downward from below eye lacking, that from eye to snout faint. Both have outer ventral rays produced making the fin notably long. In the smaller it reaches $\frac{5}{7}$, in the larger $\frac{7}{8}$ the distance to the anal origin. Both are slender, depth in standard length in the smaller specimen, 3.3, in the larger, 3.4.

As has been said, *H. leparensis* as figured by de Beaufort has a similar pattern of scale markings, and he recognized hybrids between this and *H. argus*. Two of our *H. leparensis* (all small) are comparable with his figure, as is also Bleeker's figure of *leparensis* (1862, Atl. Ichth., I, Pl. XLII, fig. 5), but most of ours are quite without this pattern and have a reduced number of vertical fin rays, as described for *H. leparensis* by Fowler (1928, Mem. Bishop. Museum, X, p. 342). *H. leparensis* (Bleeker), de Beaufort, is intermediate from *H. leparensis*, Fowler, Nichols, toward *H. argus*.

The single small specimen in the collection identified as *H. binotopsis* differs from our *H. leparensis* mainly in having a bold black bar on the base of the pectoral. This black bar is not duplicated in any

related member of the genus which I have seen.

CORIS LACÉPÈDE

We have 1 of the 5 species listed, *Coris gaimardi* (Quoy and Gaimard).

HOLOGYMNOSUS LACÉPÈDE

We have the one species listed, *Hologymnosus semidiscus* (Lacépède).

LEPTOSCARUS SWAINSON

We have the 2 species listed, *Leptoscarus coeruleopunctatus* (Rüppell) and *L. vaigiensis* (Quoy and Gaimard).

CRYPTOTOMUS COPE

We have the one species listed, *Cryptotomus spinidens* (Quoy and Gaimard).

CALLYODON BLOCH AND SCHNEIDER

We have 3 of the 46 species listed, *Callyodon bataviensis* (Bleeker), *C. forsteri* (Cuvier and Valenciennes) and *C. rubrovio-laceus* (Bleeker).

In any general collection of fishes from a given locality, some habitats and ecological niches are relatively well represented, others relatively poorly represented. The chances of occurrence of a particular fish in the collection increase with its abundance, also with the diversity of its habitats. Genera with more species should be not only more abundant in individuals than those with less, but should occupy more habitats. Hence it is in accordance with the laws of chance that only 8 of the 24 genera with from 1 to 3 species listed, are represented, 7 of the 8 with 5 to 12 species listed, both the two with 37 and 46 species listed.

On the other hand, one would not expect the individual species to be so abundant or of so general distribution in genera with more as in those with fewer species, hence not so high a per cent of them to be represented in a given collection. In the 8 genera represented with 1 to 3 species listed, 50 to 100 per cent of the species listed are represented. In the 7 genera represented with 5 to 12 species listed, in 4, 11 to 20 per cent of the species listed are represented, in 3, 33 to 75 per cent. In the genus *Halichoeres* with 37 species

listed, 32 per cent are represented; in the genus *Callyodon* with 46 listed only 7 per cent.

The 50 to 100 per cent in the first group (where less than a theoretical 33 per cent would mean non-representation), 33 to 75 per cent in the second group, and 32 per cent in the third group may be assumed to follow the law of probabilities for genera whose habitats are well represented in the

collection; the 11 to 20 per cent in the second group, 7 per cent in the third group for genera whose habitats are not. It will be noticed that the genera *Novaculichthys*, *Thalassoma*, *Stethojulis*, *Hali-choeres*, and in the parrots *Leptoscarus* and *Cryptotomus* (as compared with the often larger, more specialized *Callyodon* which is not), are well represented in this collection.